Bay Area Air Quality Management District
Risk Screening Assessment, A# 6416
Keaton's Mortuary, P# 14968
January 8, 2003

This document describes the basis for the health risk screening assessment prepared for Keaton's Mortuary, 1022 E Street, San Rafael, California. This facility wishes to operate a new crematory retort. In order to do this, the facility must get a permit from the Bay Area Air Quality Management District (BAAQMD). The BAAQMD, as a routine part of the evaluation of a permit application, prepared this screening risk assessment.

Acetaldehyde, arsenic, beryllium, cadmium, hexavalent chromium, copper, formaldehyde, hydrogen chloride, hydrogen fluoride, lead, mercury, nickel, selenium, zinc, chlorinated dibenzo dioxins and furans, and polycyclic aromatic hydrocarbons, which are considered toxic air contaminants (TAC), will be emitted during the operation of the crematory retort. BAAQMD staff evaluates the possible impact of these TAC emissions that will occur during routine operation of the crematory retort. The TAC impact is expressed in terms of the increased risk of contracting cancer by individuals who live or work near the proposed crematory retort.

The estimated increase in each of the TAC emissions, in pounds per year, that can be expected from this source are summarized in the following table:

Toxic Air Contaminant	Annual Average Emissions, lb/yr
Acetaldehyde	0.13
Arsenic	0.041
Beryllium	0.0014
Cadmium	0.038
Chromium, hexavalent	0.015
Copper	0.058
Formaldehyde	0.034
Hydrogen Chloride	155
Hydrogen Fluoride	1.0
Lead	0.60
Mercury	1.4
Nickel	0.058
Selenium	0.044
Zinc	0.35
Chlorinated dibenzo -dioxins and -furans of concern (expressed as 2,3,7,8 TCDD equivalents)	0.0000013
Polycyclic aromatic hydrocarbons (as benzo(a)pyrene equivalents)	0.000097

Ambient air concentrations of the TAC were predicted using the ISCST3 air dispersion computer model. This model uses information about the facility and the emission rates of toxic air contaminants to estimate what concentrations would be expected in the air at various locations around the site. The estimated concentrations of TAC are used to calculate the possible cancer and noncancer health risk that might be expected to arise from these exposures.

The potential cancer risk was calculated using standard risk assessment methodology. For residents, they include the assumptions that exposures are continuous for 24 hours per day, 7 days per week for 70-years. For off-site workers, exposures are assumed to occur over a 46-year period. The cancer risk calculated for students is based on a continuous 70-year exposure. No reduced exposure adjustments were made for periods when school is not in session; this results in a very conservative estimate of risk. The cancer risk is based on the "best estimates" of plausible cancer potencies as determined by the California Office of Environmental Health Hazard Assessment (OEHHA). The actual cancer risk, which cannot be determined, may approach zero. This type of analysis is considered to be health-protective.

The potential for noncancer health effects is evaluated by comparing the long-term exposure level to a Reference Exposure Level (REL). A REL is a concentration level at or below which no adverse health effects are anticipated. RELs are designed to protect sensitive individuals within the population. Comparisons to RELs are made by determining the hazard index, which is the ratio of the estimated exposure level to the REL.

The proposed operation would result in a maximum increased cancer risk of 6 chances in a million and a hazard index of 0.2 for off-site workers near the facility. For the nearby residences, the maximum increased cancer risk is 3 chances in a million and the hazard index is 0.05. For the students at Marin Academy, the increased maximum cancer risk is 2 chances in a million and the hazard index is 0.04. For the students at St. Raphael's Elementary, the increased maximum cancer risk is 1 chance in a million and the hazard index is 0.02. These health risk values, presented in the table below, meet the criteria for acceptable levels established in the BAAQMD's Risk Management Policy.

Health Risk Results		
Receptor	Increased Maximum Cancer Risk	Hazard Index
Off-site worker	6 chances in a million	0.2
Residential	3 chances in a million	0.05
Marin Academy	2 chances in a million	0.04
St. Raphael's Elementary	1 chance in a million	0.02

School addresses: Marin Academy
1600 Mission Ave.
San Rafael, CA

St. Raphael's Elementary
1100 Fifth Ave.
San Rafael, CA